Canal Zone Notes
Book #5

#5

Wireless St.
Cr. Ces

U. S. GEOLOGICAL SURVEY

GEOLOGIC BRANCH

LOOSE-LEAF FIELD NOTEBOOK

Canal Zone Notes
Book #5

Page	Location	spec. or Fossil Lot
1-4	Montelerio - Bohio	
5-6	Up Chagres to Alajuela	
7	Fossils near Alajeula	
8	Pedro Miguel - Miraflores	
9	Gamboa Bridge p- Caimito Junct.	
13	West of Gatun Dam	
13-14	Taro Point	
15	Lion Hill &c	sp.
19	Ridges Bohio to Ahorca Lagarta	
22-29	Cores form rock foundation Balboa	
31-35	Examination of ground for wireless station foundation - Balboa	
37	Went up Balboa Hill	
39	Vicinity of Caimito Junction	
45-57	" " New Frijoles	
59-61	Vicinity of Dump 6 to Caimito	
63-69	Gorgona and vicinity	
71	Cruces and vicinity	
73	Matachin to Bas Obispo	
77	Tabernilla coal deposit	
79	Ridge west of Gatun Dam	
81	Bas Obispo to Culebra	
83	Rates for Banana planting	
84	Some names of trees	

675 Peculiar lense or wedge of dark ~~fine~~ carbonaceous tuff here similar to tuffs above. Inuifhans [illegible] rocks about 50 feet thick shows some smooth clam shells (unios) same dark gray tuff conglomerate or limit rocks

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679 approx mostly highly weathered variegated tuff masses not sure of any bedding this mass is streaked

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682 ± fine tuffs &c

Fossiliferous limy tuff

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780 rocks dip S 35° Extra conglomerates go down here

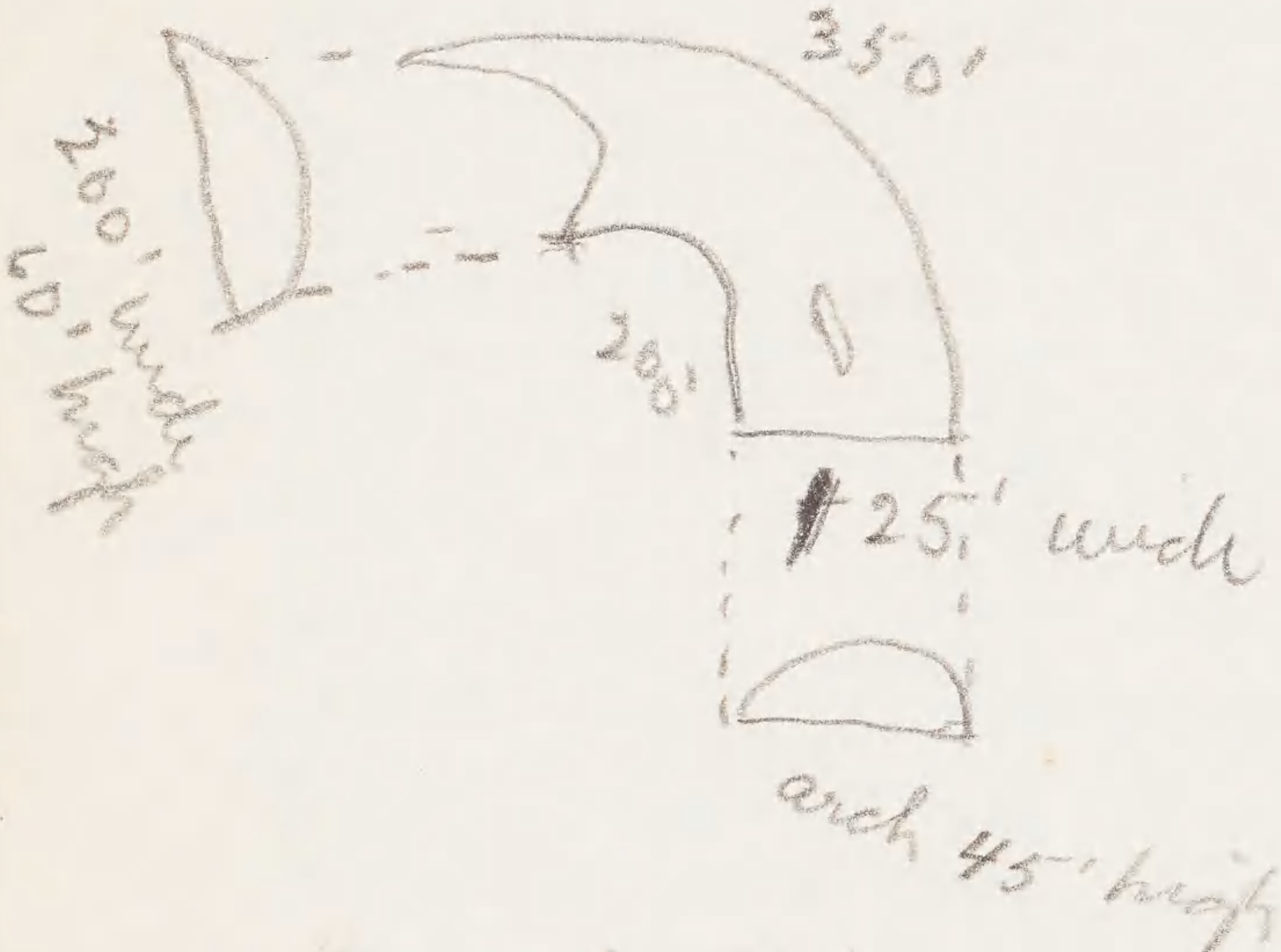
May 2ed went up Chagres to Altawalla

May 3ed went out to see natural bridge at La Puente. Followed trail and found Gatun and Fort Laurenzo rocks out to first Savanna about 3 miles out. Then changed off on other trail and found old andesites cut by newer andesites to Quebrada ~~de~~ Del Lion creek about 200 yards before reaching this Fort Larenzo limestone comes in again. Limestone all around here and upp alltulewala has very little soil on it. The savannas seem to be due to newer andesite cutting older andesite and limestone. Sample of earth taken from 1st and 2ed Savannas also from what appears the old andesite ground outside of the savanna. In the latter place soil supports fairly heavy growth of small timber and vines.

Limestone extends from Del Lion Creek for about a mile then volcanic basic rocks ~~cut~~ show in several places where there are savannas. Part of these savannas are of limestone but these seems to

be the case only around certain edges. Some volcanics [illegible] at intervals & within 1½ miles of La Puenta R.

natural bridge on La Puenta river



Arch dissolved out of the coral limestone found all down river from where trail crosses and back 1¼ miles on trail from river. This limestone locally shows water deposition and recrystallization on quite a large scale. Specimens

May 4th Collected fossils as follows

#1 Across Chagres river opp Alhajuella limy tuff of gray color very massive mostly pectens? This rises about 200 or 225 feet above the river

#2 Taken ½ to ¾ mile above Alhajuella and as the rocks along all there dip say 5° down river these fossils must be about 300 feet lower down stratigraphically than those in #1. Rocks about the same grey massive limy tuff & limestone. Here many large double ribbed pectens come

#3 50 to 75 feet below #2 see note

#4 In sac good gray limestone with some little tuff. Seems to be largely finely divided shell and coral fragments. Giant oysters and pectens (?) with large ribs also many masses of large flat double ribbed pectens.

#5 Not in any say 25 feet or so below #4 Very hard rather creamy limestone which has been dissolved by the river into many odd shapes and its surface in contact with the water is in minute little ripples. Bed of large oyster

[illegible] about to get things together and [illegible] for [illegible] but the rest [illegible] [illegible] good [illegible]

[illegible]

May [illegible]

[illegible]

Most of the [illegible]

[illegible] fragments [illegible]

[illegible]

(2) about 5 feet above present shore line — large swampy areas here as at Mount Hope and Mindi

(3) about 50 & 55 feet above present sea level as on top of present low ridge now being Quarried

Locally and around shore cliffs some of this material looks gray and somewhat sandy not much unlike the Gatun formation but certainly more limy

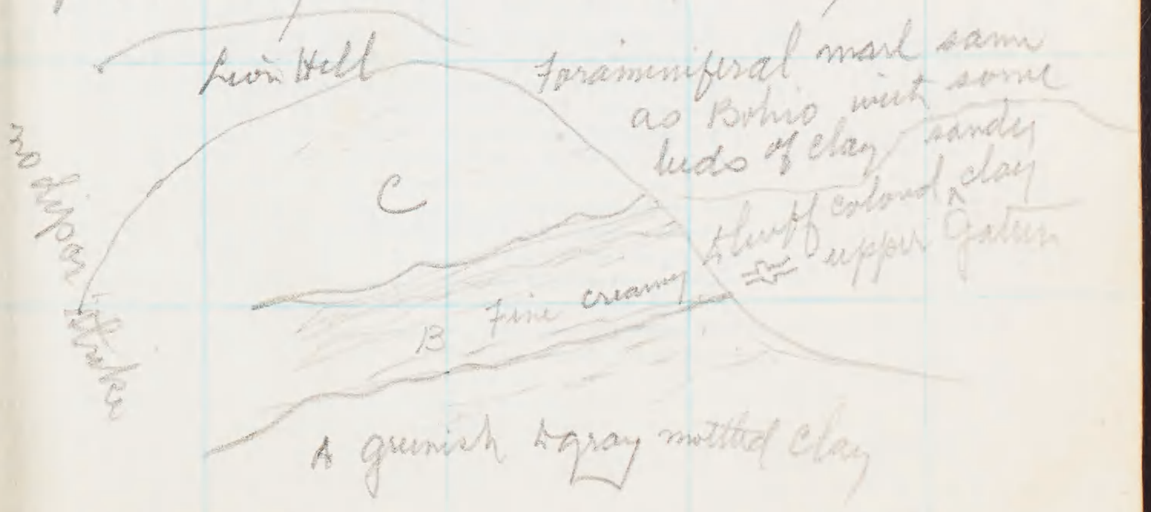
Feb 8th 1914

Got off train at Almirante Lagoon and followed railroad to Gatun

Some cuts up to 6 feet deep just S of almirante Lagoon show nothing but horizontal soil no rock

Southern edge of Lion hills just N of Black swamp have show volcanic looking basic light-gray to greenish clay with mottled iron oxide spots. This clay is in patch 3' below surface and is plastic to touch

Lion Hill found trail up side not partway then climbed it up



Spec 298?

Foraminiferal sandstone [illegible]
dips northward say 8°
all the below may be more or less
[illegible]

4 Fine foraminiferal sandstone
basic and somewhat [illegible]
3 Dark basic coarse foraminiferal
sandstone (Bolus)
2 Light gray light buff [illegible] clayey
1a sandstone beds
1 Fine basic agglomeratic material
in sandstone fragments show
clearly and are decomposed
"Fine conglomerate of Carmel 55. [illegible]

[illegible] sometimes a transition from
sandstone into sandstone with fine
basic particles and finally down
volcanic agglomerate. This is
shown at corner of hill [illegible]
cut here or both sides
of track on top of this [illegible]
sandy clay then basic foraminiferal
sandstone and marl beds. Some
of the beds immediately on top of this
are very light colored near their
outcrops.

Rocks here dip toward [illegible] about
due N at say 8° or 9°

Succession today might be [illegible]
foraminiferal sandstone [illegible]

Feb 9th Trail to Bohio thence worked ridges near Atarra Lagarta

Ridge just south of atarra Lagarta is light colored limy ~~arkosic~~ sandstone locally quite marble. Bedding nearly horizontal.

By following up this ridge towards east find light colored limy sandstone all the way to top P.B.M. 14A El 134.233

Ridge just north from Bohio is all conglomerate

Coarse buff conglomerate rounded ~~angular~~ and sub angular boulders cobbles pebbles cut on right [illegible] from Arata junct

Cores from Dock borings Kallina Dry Dock [illegible]

Center Line of Dry Dock

A hole El +24 Rock +23 Depth −65
Same as hole C

B hole El +19.6 Rock −4.4 Depth −47.6 [illegible]
Same as C not much decomposed.

C hole El +19.1 Sand [illegible]
Rock at +[illegible]
all very deep [illegible] same as [illegible] [illegible] Sam hole [illegible] [illegible] [illegible]
bottom of hole = −65

D El +19.1 Rock +14.8 Depth −65.6
Same as C hole fairly decomposed feldspars [illegible] [illegible] [illegible]

E El +16.4 Rock −10.6 Depth −67.6
Same as hole C but [illegible] decomposed feldspars [illegible] and [illegible] [illegible] [illegible]

F El +17.7 Bottom −65
Rock at −10.3
Same [illegible] as hole C but [illegible] more [illegible] [illegible] feldspars [illegible] decomposed [illegible]

Holes

1 Same as C
El +24.0 Rock +19.0 Depth -42.6

2 El +19.6 Rock +14.6 Dpth -38.1
~~Hard~~ Same as C (hard)

El. +20.3 Rock +17.0 Depth -44

3 Same as C

Same as C El +14.2 Rock +13.2
Depth -8.6

4 (Chip taken very solid)

El +19.1 Rock +14.4 Depth -41.4

5 Same as C

(Same as C. El +19 Rock +10.2 Depth -42.6

El 19.5 Rock +12.0 Depth -28.4

6 Same as C

El +19.4 Rock +12. Depth -14.4

8 Same as C

9 Same as 8
El +19.4 Rock +15 Depth -37.

10 Same as 9
El +18.4 Rock +10.4 Depth -28.

11 Same as 10
El +19.4 Rock +17.4 Depth -41.3

El +18.4 Rock +6.4 Depth -40

12 Same as C core cut some slanting joint planes and shows weathering where it has so.

13 Same as 10 TC
El +19.4 Rock +15.4 Depth -38.6

El +18.5 Rock +1.5 Depth -27.6

14 Same as C but very highly weathered feldspars white matrix brown gray bluff colored

El +14.2 Rock +13.3 Depth -42
15 Exactly same as 14 [illegible]

16 El +14.1 Rock +3.6 Depth -37.2

17

El +19.1 Rock -3.1 Depth -46.4
18 Same as 15 [illegible]

El [illegible] Rock [illegible] Depth [illegible]
19 [illegible] [illegible] portion of [illegible] [illegible]
[illegible] at C hole [illegible]
[illegible] [illegible]
[illegible] [illegible] [illegible]
[illegible] [illegible] [illegible]

20

21 El +19.5 Depth -28.6
Rock -11.2
Rock [illegible] same as 7 hole
[illegible] [illegible]

Same as hole C [illegible]
22 El +15.1 Rock -13 Depth -27.2

St 5 This peak has a very shallow soil cover, a few inches to a foot or two, then gray, green-spotted, San Pablo conglomerate. This material is somewhat weathered on top but would nevertheless make a good foundation probably somewhat better than the Gatun formation and not so good as the dry dock at Balboa

#6 Same as #5 with one piece of basaltic float on its lower shoulder which may indicate dike, but this will strengthen it rather than otherwise

7? Same. The conglomerate and tuff beds on lower W. slope

8) [illegible] dike forms top of hill cuts light gray tuff &c.

9 [illegible]

10 San Pablo green spotted congl. Just [illegible] of this is l [illegible] sandstone with [illegible]?

11 Clayey sandstone [illegible] and conglomerate series overlain by 2.5.

Sunday March 10th 1912

Walk up Ballena Hill

Succession from Gorgona white tuffaceous showing specks of ferro-magnesian minerals and these underlying Conglomerate beds and clays

On top of this are foraminiferal limestones just same as succession at wireless station

Ballena Hill and other hills here are due to intrusions of very dark dense basalt

I note that some of these sharp peaks are in line as though they represent dikes which locally show necks

Mar 15 Cont.

This brecciated zone is 20' wide on the S and W side of R.R. but is much narrower say 2' on S & E side This brecciated zone is thus locally enlarged by sort of local phenomenon. Rocks along all contacts seem blu same. This brecciated zone seems the connecting link between which shows that Contractus Hill Empire bridge and other breccias are the broken crowns of big intrusions

(5) Coarse lava conglomerate similar to that at Cimets Junct

(6) San Pablo formation no soil on crest of this hill & and outcrops almost corner

(7) Very light weathered lustrous clay here the unweathered product of which is blu gray and rather coarse and evidently is derived from basic rocks and is not the same as that found near Cimets Junct Dips about 15° west and seems to overly San Pablo formation

Sec

51 Hard dark basaltic dike cutting
spec Coarse basic wayke and clay beds
Just S of this dike the beds are
darkish coarse and very basic
There is a little bedding but the
material has been laid down
in rather massive form. It seems
probably derived from nearby andesites
or gabbros and apparently with
very little sorting or weathering
This coarse dark basic bedded material seems
like the same as the large basic [illegible]
beds found on [illegible] line S of
[illegible] Tryphe

19 Sharp [illegible] [illegible] [illegible] faulting
[illegible] [illegible] [illegible] [illegible] similar to
that at 18 [illegible] [illegible] [illegible].

Sat March 16th 1912 Outcrops morning
Express to New Frigoles

(1) Cut 1 mile N of New Frigoles Conglomerate layers with interbeds of Wayke
Pebbles and cobbles in this congl. are mostly of the coarse hornblend-por type showing very little quartz. The fine bedded wayke shows some hornblend fragments but very little quartz so that it is much less quartzitic than the wayke found at Limeta Junction still Still these rounded boulders and cobbles are blue of the same general character as those in lower part of that wayke so will classify this same as that
Dip 40° S. About 300' of beds exposed in this 1st Cut. Largest boulders noted about 2 ft in diam

(2) Light colored clay considerably weathered and shows little bedding This would probably all have to be classed in with the conglomerate series although it seems to be under it

(3) Gray Coarse sandy marl Shows many foraminifera and is same as that found near Bohio Fairly well bedded + dip 40° SW

11) Dark basic much altered dike [illegible] or rather seems like zone of [illegible] or neck for it appears on the E side of railroad only. Seems like a basalt [illegible] more basic for it shows considerable serpentinization with secondary calcite [illegible] epidote [illegible]

Just N of culvert 1910

B.M. on culvert 121.10 is 350 [illegible] almost fills the space between culvert 1910 in S and 1909 in North

Opp. [illegible] 1908 on W side of [illegible]

a dark basic breccia zone shows [illegible] in cut. This is evidence that the hill which rises up west of the cut here (practically no embankment on the east here) is due to an elongated plug of this basalt and that the outer brecciated zone of it shows in the cut

Succession at [illegible] [illegible] [illegible]

[illegible] 1 [illegible]

2 [illegible] [illegible] [illegible] [illegible]

3 Conglomerate [illegible] [illegible]

[illegible] [illegible]

Monday March 18th went out to New Tryples
on morning train

(5) Foraminiferal clay beds gray and coarse same as (3) and same as at Robles. R.R. cut immediately north of [illegible] close to New Tryples almost at the switch leading to Tryples with these coarse grayish foraminiferal ~~clays~~ marls or washes are some very light weight highly weathered clays and some light colored sandy clays or soft sandstones They all dip Southeastward about 65°

(6) Highly weathered Coarse conglomerate here under the clays now this conglomerate seems to lie below the foraminiferal gray beds so it may be much older than the conglomerate at (1) a mile N of here.

(7) This great wide comparatively flat bottom here shows occasional outcrops of limestone and found a small local area of basic andesite float. Mostly however good dark loam soil but soil is shallow. several sugar cane plantations (small ones) in this flat.

(8) On relocated line say 3 miles S of New Tryples big mass of ~~[illegible]~~ slightly porphyritic andesite or basalt outcrops here seems to cut clay and clay is

March 18th Court

Spec

(4) Conglomerate cell string has shown in cell

March 20 outcrop express to Dump 6

(5) Dump 6 100 yds North of lower hwy conglom
conglomerate bank cut by creek (basic)
about 3 feet thick This conglomerate
all along hwy contains considerable
fine material and gravels cobbles
and boulders up to 30" in
diam. some rough bedding with
dip mostly approx parallel
to surface of ridge cut through
cobbles and boulders mostly
dark and basic with some
few fragments showing hornblend
mostly feldspar &c.
about 1000' S of St 1195

This conglomerate extends far in eastward
Spec of track as shown where dump extends
in 1/3 mile to cutin Slope which shows
same conglomerate

St 1150 Same conglomerate but along
here there are some angular
and subangular fragments
however it seems to be all
the same general series
This same formation extends right

up to Cimito Junct.

(1) Bailamonos good big outcrops of limestone all along here Dip about 10° W
L.S. shows some sea urchins + and locally is gray and sandy on fracture
Spec shows fossils
same but same L.S. as is found at Las Cascadas + up Chagres
Locally shows X bedding

(2) Congl begins here L.S. does not go up above 75 ft or less and congl sticks up through
W.

(3) Just S of Mamei in R R cut around curve 500 from switch big mass of hard dark Basalt or Gabbro in contact with gray foraminiferal limestone and some light weathered beds with lithic fragments and some small fragments of ferro-mag. Crystals. and this seems to overly the Conglomerate series Relations are not very clear here. Meta- has been

very considerable probably noticeable for 20' or 30.

Spec's showing fossils

½ mile N of Gorgona

Thursday March 21 / 12

Morning Express to Gorgona

(1) Good but much weathered basic clay beds overlain by conglomerate beds where the pebbles are well rounded and comparatively fresh. This series of gravels and clays is certainly quite young and can be differentiated from the older massive conglomerates (probably ?)

(2) Hill or here a ridge about 500 high shows angular and subangular fragments of hard dark basalt or gabbro. See no definite evidence of a dike but there may be one here. ~~This however is not~~

(3) Mass of boulders cobbles &c rounded to subangular and some almost angular

(4) Mass of coarse decomposed conglomerate subangular to rounded

(5) [illegible] light colored [illegible] weathered basic [illegible] &c — ~~[illegible]~~ unconformable on (4)

(3) This hill seems to be about 400 high. On top of it I find fragments of hard basic sandy weathered beds, light colored weathered wacke also some large fragments of the usual basic basalt or gabbro. This is most difficult to classify. I am not certain whether it represents the younger conglomerate beds but it probably does. If it does then probably only the top 100' represents the younger while below that the older conglomerates are in place

(4) Conglomerate beds fine & clayey overlying darker beds of congl.
This seems to be all younger congl. and some light clay beds

5 Two dikes here like this seemingly coming from the same source and cutting conglomerates and some agglomeratic looking dark roughly stratified material. These two dikes are weathered rather gray and locally might be mistaken for material found on top of hill at (3)

5. Volcanic Breccia

(6) Light colored lava flow here similar to that found in the bottom [illegible] Same kind as [illegible] edge or possibly [illegible] 140' wide

(7) Lava breccia flow here at [illegible] Same as formed [illegible] 300 ft wide [illegible]

March 28 / to Lebanon Coal
mine
Found old holes & pits. Have
no surface indication
all grown up with brush
In streams nearby [illegible]
all large angular pieces
of [illegible]

At Lebanon St gravel
& clay of Carrot Congom...
At B... bridge [illegible]
dip away from San Pablo
formation outcrop top
of bank

June 8th 1912 Outon
ridge west of Gatun dam
Δ T. St. bears N79E to
sharp curve out of relocated line
⅓ mile S. of Gatun.
and S33E to big curve in Canal
Δ Gatun triangulation St

Fault trend = ~~E~~ to N60W
or shear zone Gatun on E
Caguina on W. Extensive
fracturing

fossil lot II from new
excavations westward of dam
Gatun some pebbles along
contact but no noticeable
unconformity

Monday Jun 10 K B Obispo Through
out fragments in B O Breccia mostly
~~at~~ roundunded but a few subangular
all seem to be basic and granular
& all nearly same composition but
much weathered comparatively

along some of the major fissures rock
has turned whitish from water seepage
& perhaps hydrothermal action

most of pebbles same as coarse
dark basic greenish lava see
spec + This hydrothermal ? action
has left considerable calcite and
serpentinized locally some of the
sheared rock very probably
hydrothermal see no quartz

a lot of calcite along nearly all fissures
in sedimentary getting beds also a
lot of calcite as concretions

84